

Appl. No. 10/664,641
Amtd. Dated June 15, 2007
Reply to Office action of June 1, 2006

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A display element comprising:
a plurality of pixel portions arranged two-dimensionally with a predetermined pixel pitch and
a microlens array including a plurality of microlenses arranged two-dimensionally corresponding to said plurality of pixel portions on an incident side or an emission side of light with respect to said pixel portions, wherein,
in said microlens array, each microlens has a lens surface of a hyperboloid of revolution, and a lens pitch of said plurality of microlenses is set to a pitch smaller than the lens pitch able to substantially equivalently maintain a converging efficiency of a lens of the hyperboloid of revolution and a lens of an ellipsoid of revolution with respect to the incident light and able to maintain a converging efficiency higher than the converging efficiency of the lens of the ellipsoid of revolution.
2. (Original) A display element as set forth in claim 1, wherein the pixel pitch is made 20 μm or less.

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3. (Original) A display element as set forth in claim 1, wherein the focal position of each microlens substantially coincides with each pixel portion.

4. (Original) A display element comprising:
a plurality of pixel portions arranged two-dimensionally with a predetermined pixel pitch and
a microlens array including a plurality of microlenses arranged two-dimensionally corresponding to said plurality of pixel portions on an incident side or an emission side of light with respect to said pixel portions, wherein,

in said microlens array, each microlens has a lens surface of a hyperboloid of revolution, and a lens pitch is 20 μ m or less.

5. (Original) A display element as set forth in claim 4, wherein the pixel pitch is 20 μ m or less.

6. (Original) A display element as set forth in claim 4, wherein the focal position of each microlens substantially coincides with each pixel portion.

7. (Original) A display device comprising:
a plurality of pixel portions arranged two-dimensionally with a predetermined pixel pitch,
a light source emitting illumination light for

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illuminating said pixel portions,

a microlens array including a plurality of microlenses arranged two-dimensionally corresponding to said plurality of pixel portions on an incident side or an emission side of light with respect to said pixel portions, and

a projection lens for projecting light emitted from said pixel portions, wherein,

in said microlens array, each microlens has a lens surface of a hyperboloid of revolution, and a lens pitch of said plurality of microlenses is set to a pitch smaller than a lens pitch able to substantially equivalently maintain a converging efficiency of a lens of a hyperboloid of revolution and a lens of an ellipsoid of revolution with respect to the incident light and able to maintain a converging efficiency higher than the converging efficiency of a lens of the ellipsoid of revolution.

8. (Original) A display device as set forth in claim 7, wherein the pixel pitch is 20 μm or less.

9. (Original) A display device as set forth in claim 7, wherein the focal position of each microlens substantially coincides with each pixel portion.

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10. (Original) A display device comprising:
a plurality of pixel portions arranged two-dimensionally with a predetermined pixel pitch,
a light source emitting illumination light for illuminating said pixel portions,
a microlens array including a plurality of microlenses arranged two-dimensionally corresponding to said plurality of pixel portions on an incident side or an emission side of light with respect to said pixel portions, and
a projection lens for projecting light emitted from said pixel portions, wherein,

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in said microlens array, each microlens has a lens surface of a hyperboloid of revolution, and a lens pitch is 20 μm or less.

11. (Original) A display device as set forth in claim 10, wherein the pixel pitch is 20 μm or less.

12. (Original) A display device as set forth in claim 10, wherein the focal position of each microlens substantially coincides with each pixel portion.

13. (Original) A microlens array including a plurality of two-dimensionally arranged microlenses, wherein

each microlens has a lens surface of a hyperboloid of revolution, and the lens pitch of said plurality of microlenses is set at a pitch smaller than the lens pitch able to substantially equivalently maintain the converging efficiency of a lens of the hyperboloid of revolution and a lens of an ellipsoid of revolution with respect to the incident light and able to maintain a higher converging efficiency than the converging efficiency of a lens of the ellipsoid of revolution.

14. (Original) A microlens array including a plurality of two-dimensionally arranged microlenses, wherein:

each microlens has a lens surface of a hyperboloid of revolution, and the lens pitch of said plurality of microlenses is 20 μm or less.